

WINDOW

CREIGHTON UNIVERSITY

FALL 1997

EMERGING DISEASES

FINDING GOD IN
YOUR EVERYDAY WORK

THE CLASS OF 2001
BEGINS AT CREIGHTON

THE REALITIES AND
IMPLICATIONS OF CLONING

WINDOW

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From Cholera to AIDS: Diseases Continue to Plague Us

With the eradication of smallpox in the late 1970s, many thought infectious diseases would disappear. Instead, new diseases have emerged and some familiar diseases have bounced back with a new virulence. Professor and Chair of Biology Theodore E. Burk addresses the phenomenon starting on Page 3.

They're Diverse, They're Bright, They're the Class of 2001

Associate Professor Eileen Wirth takes an in-depth look at the Class of 2001. While a high number say they plan careers in the health sciences, the class represents a wide range of backgrounds and interests. Find out more about Creighton's newest class on Page 13.



Dorothy Pritchett, BSN'67
Wills Point, Texas



Work as a Calling: Finding God on the Job

Law Professor and A.A. and Ethel Yossem Endowed Chair in Legal Ethics Joseph G. Allegretti discusses ways to integrate faith into everyday work, whether you're a homemaker, teacher, doctor or plumber. Page 18.

The Prospect and Implications of Human Cloning

With recent advancements in cloning sheep and cattle, the possibility of cloning human beings moves closer to reality. Kevin T. FitzGerald, S.J., a member of Creighton's Board of Directors and a research associate at Loyola University Medical Center, examines the issue. Page 22.



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LETTERS

WINDOW magazine may edit Letters to the Editor, primarily to conform to space limitations. Personally signed letters are given preference for publication. Our FAX telephone number is: (402) 280-2549. E-mail to: window@creighton.edu

Soul Stirring

The article in the summer 1997 issue of WINDOW by Fr. Richard Hauser captured my immediate attention. In reading it, it awakened the Spirit within me. It was inspirational, enlightening and soul stirring. Hopefully, WINDOW will be featuring future articles of this nature. A very special thanks to Fr. Hauser. The article will be saved to share with friends and for my own future review.

Grill Uncivil To Women

In a periodical noted for its taste, it was disappointing to read an article featuring a former neighborhood grill notorious for its incivility to Creighton women. For other modes of discrimination, the grill would have been boycotted or should have been.

N.J. Lemke, S.J.
Jesuit Community
Creighton University

Quiet Jesuit Touched Lives

I've never seen an article about the quiet Jesuit who presided over the physics lab in pre-World War II days. He must have touched the lives of every pre-dental and pre-med student of that era. Does anyone out there remember him?

His name escapes me, but I'll never forget his hand-written signs that decorated both lab and lecture rooms. One in particular stands out: "Voluntary contributors to the Annual Varnish Fund may signify their intentions by putting their feet on the desk in front."

Margaret Rossie Taylor, BS'39
Littleton, Colo.

Wrong Guy

You misidentified the man pictured on page 25 of the summer 1997 issue. He is Michael Farrall. WINDOW looks great! It keeps me in touch with "home."

Judy Sing, BA'91
Macomb, Okla.

“Plagues Are As Certain As Death And Taxes”: Emerging And Re-emerging Diseases

Theodore E. Burk, Phil.D.
Professor & Chair of Biology

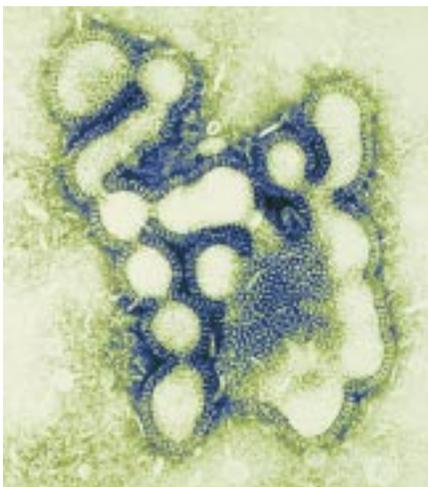


A unique event in the long saga of the human struggle against disease occurred on Oct. 26, 1977. In Merka, Somalia, Ali Maow Maalin was diagnosed as having smallpox. There was nothing unique about a person contracting smallpox; except for tuberculosis, no other infectious disease had taken so many human lives over the centuries. What was unique was that Ali Maow Maalin was the last person ever to contract smallpox under natural conditions. When he survived his infection, smallpox was extinct in the wild — the only disease pathogen ever completely eradicated in nature by human effort. Smallpox eradication, the culmination of an 11-year, \$300 million campaign, seemed to many to mark a milestone in human history, the dawning of an age in which infectious diseases would disappear one after another and would no longer constitute an important cause of human suffering and death.

*Dr. Burk. Background is an enlarged photo of the AIDS virus.
Photo by Kent Sievers*

Ten years earlier, U. S. Surgeon General William H. Stewart had told a White House meeting of state health officials that it was time to move beyond infectious diseases and concentrate the nation's health resources on chronic diseases such as hypertension and diabetes. Bright young graduate students were discouraged by their mentors from going into the dead-end field of infectious disease epidemiology.

Then, in 1975, came Lyme disease. In 1976, Ebola hemorrhagic fever and Legionnaires' disease. In 1978, toxic shock syndrome. In 1979 (although the virus wouldn't be discovered for several more years), acquired immune deficiency syndrome. In 1982, *E. coli* 0157:H7 food poisoning. In 1993, hantavirus pulmonary syndrome. Mixed in with all of the above was a geographic menagerie of other new diseases — Marburg, Machupo, Junin, Lassa. And, as if this swarm of "emerging diseases" wasn't enough to belie the optimism of the 1960s and early 1970s, familiar diseases returned in new and deadly forms — yellow fever, dengue, malaria, *Staphylococcus*, tuberculosis, cholera. Instead of disease eradication, humankind seems to be headed into a



Viruses such as influenza, pictured above, are common in the United States and elsewhere. Some strains, however, can be deadly.

new era of "disease turnover," in which old diseases fade away under the advances of medicine, only to be replaced by new diseases or new forms of the old ones.

Instead of disease eradication, humankind seems to be headed into a new era of "disease turnover," in which old diseases fade away under the advances of medicine, only to be replaced by new diseases or new forms of the old ones.

In this article I discuss where such "emerging and re-emerging diseases" come from, by what pathways they can become widespread and established as human epidemic diseases, and how in almost all cases human alteration of the natural environment has been a significant contributor to their emergence and spread. Finally, some ways to anticipate the arrival of new emerging diseases and to mitigate their effects are mentioned.

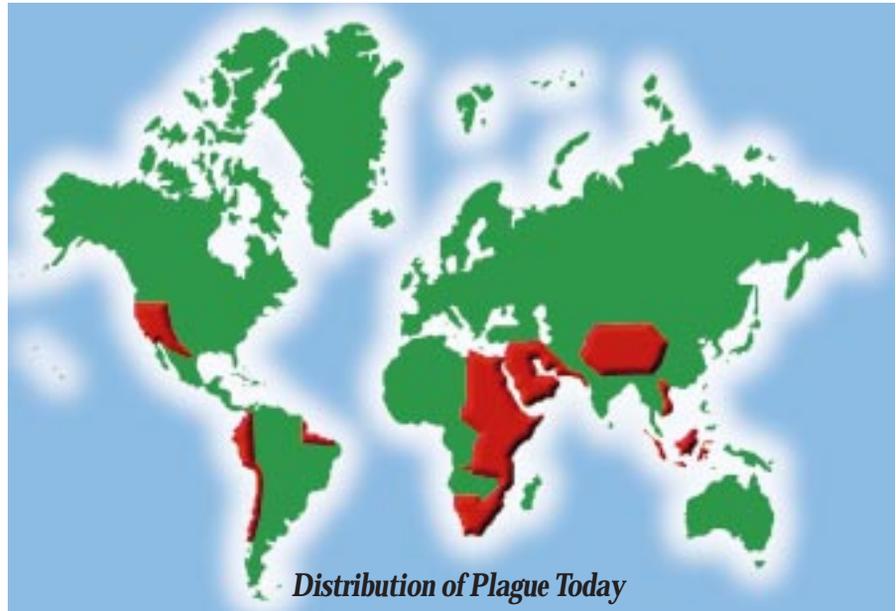
It is useful to begin by reviewing the history of humankind's struggle with disease, as summarized by Jared Diamond of UCLA School of Medicine in his books "The Third Chimpanzee" and "Guns, Germs, and Steel." Four distinct stages can be recognized. The first, beginning with the origins of humankind and continuing until the advent of agriculture in the past 10,000 years, involved people living in the hunter-gatherer lifestyle for which

our species evolved. While it may seem impossible to reconstruct the health problems of prehistoric people, practitioners of the science of "paleopathology" attempt to do this by examining skeletal remains (and occasionally well-preserved mummies or air-dried feces). Surprisingly, they have found that most preagricultural people were, on average, taller and healthier than the people who followed them. In general, they had strong bones and teeth free of cavities, and show little evidence of nutritional deficiencies. They did suffer accidents (many bones exhibit healed fractures), they certainly had their share of parasites such as intestinal worms (many of these "heirloom diseases" brought along by people from their primate ancestors), they suffered wounds that became infected, and they occasionally picked up an animal disease from the wildlife with which they came into contact (such diseases are called "zoonoses," and they play a major part in our story, as will be seen).

The invention of agriculture, which occurred several different times in different areas of the world, ushered in the second phase. Agriculture, from the perspective of paleopathologists, was a very mixed blessing. Domestication of crops led to increased food supplies and greatly increased human populations, but the new crop foods tended to be high in carbohydrates and low in proteins and other nutrients. The larger populations supported by agriculture were composed of people who thus grew to be smaller than their hunter-gatherer ancestors, lived shorter lifespans, and showed much greater evidence of tooth decay and nutrient-deficiency diseases. Also, with large populations dependent on just a few staple crops such as rice, wheat or corn, massive starvation resulted if bad weather or plant disease caused crops to fail. And domestication of animals, leading to close and prolonged contact between

the domesticated animals and these agricultural people, meant that animal diseases crossed over to people much more frequently and began to evolve new, specifically human-infecting forms (“souvenir diseases”). The list of human diseases that are likely to have been derived from related diseases of our domesticated animals is long and shocking; a very incomplete list includes measles from dogs, tuberculosis and smallpox from cattle, influenza and whooping cough from pigs, the common cold from horses, and malaria from birds. In other cases, our diseases came not from intentionally domesticated animals, but from animals that had voluntarily taken up cohabitation with us — one example being bubonic plague, a disease of wild ground squirrels that occasionally spread to rats and, because of humanity’s close contact with rats in crowded urban settings, people.

Phase three involved a natural progression from phase two. The food surpluses and hierarchical societies that resulted from widespread adoption of agriculture rapidly led to the growth of large cities, in which most of the human population was packed together at densities far higher than ever experienced before. Under such circumstances, the stage was set for the emergence of the great infectious disease plagues that were the major source of human mortality for the past few thousand years, right up to the 20th century. The diseases listed above, plus others such as cholera, polio, typhus and typhoid, were able to establish themselves permanently in the large, densely crowded populations of people living in cities, especially given poor sanitary procedures that facilitated spread of the pathogens during interpersonal interactions (actual physical contact as well as the inhalation of the pathogen-bearing exhalations of nearby people) and contaminated food and water supplies.



Diseases such as the bubonic plague have spread worldwide, as shown by the red areas above. The plague, originally a disease of wild ground squirrels that spread to rats and then to humans, decimated Europe for 400 years.

By the turn of the 20th century, as a result of such discoveries as vaccination by Jenner, the germ theory of disease by Pasteur and Koch, antiseptic procedures by Lister, the importance of pure water supplies by Snow, and the disease-spreading role of insect vectors by Ross and others, rates of most epidemic infectious diseases were already falling rapidly, especially in Europe and North America. By the middle of this century, the worldwide spread of higher standards of sanitation, accompanied by the discovery and use of antibiotics against bacteria and pesticides against disease vectors, led to the optimistic

situation described in the opening paragraph. The dramatic decline of the “classic” epidemic diseases, dramatically illustrated by the elimination of smallpox, was supposed to usher in a fourth era, in which — at least in developed countries — most health problems would be due to chronic “lifestyle diseases” such as heart attacks, strokes, cancer and diabetes. In this era, as we saw above, epidemic infectious diseases were not supposed to be important health concerns. But, as we also saw, this pure fourth era hasn’t yet arrived, and it never will. Instead, our real new era is one in which lifestyle diseases assume greater prominence, but are accompanied by an ever-changing challenge from new infectious diseases and different and dangerous forms of previous ones, a period not of infectious disease disappearance but of disease turnover.

Where do all these “new diseases” come from?

The answer, in almost every case, is, “from the same place old diseases came from — existing diseases of other species.” In that sense, emerging

The list of human diseases that are likely to have been derived from related diseases of our domesticated animals is long and shocking.



The proximity of deer to human populations has increased the spread of Lyme disease in North America. As many as 10,000 Americans per year contract Lyme disease, which is spread through the bites of deer ticks.

diseases are not new at all, just new to humans (or, having been present in human populations but not recognized, merely newly identified). For example, Lyme disease, a bacterial disease with initial flu-like symptoms that can progress to a more serious arthritic condition, is contracted by people bitten by ticks, especially the deer tick *Ixodes scapularis*. While as many as 10,000 Americans per year contract Lyme disease, it is primarily a disease of deermice, vectored by ticks cycling between deermice and white-tailed deer. Hantavirus pulmonary disease, first recognized after an outbreak in 1993 in the Four Corners region of the American southwest that affected both Navajo Indians and other people in the region, is a disease of deermice, contracted by humans who inhale the virus in airborne particles of mouse urine and feces. Many of the more exotic emerging tropical diseases

also fit this pattern: Lassa fever, endemic in much of West Africa, is primarily a disease of the rodent *Mastomys natalensis*. While the animal origin of the deadly Ebola virus (50-90 percent mortality in hundreds of cases each in four African outbreaks in the past two decades) has not yet been identified, many scientists suspect bats, rodents or monkeys. (Ebola has devastated one population of chimpanzees in the Ivory Coast that has long been intensively studied by primatologists, suggesting that chimps, like humans, are not the natural hosts but victims of occasional cross-species infection.) HIV (human immunodeficiency virus), the AIDS virus, is closely related to viruses that infect (but do not cause serious disease in) African monkeys and chimpanzees, and the most widely



Photos by Mark Dietz

accepted theory for its origin is from one of these primate viruses. For a pathogen from one species to survive and reproduce in another, such as humans, is not a likely event. Since different species have different biochemistries and physiologies, pathogens that are well adapted to invade one kind of organism are unlikely to be able to overcome the defenses of a very different kind of organism; only where the new host is physiologically similar to the old host is the infection likely to take hold. As a result, most of the zoonoses that humans acquire come from other animals that are relatively closely related

to us; in a survey of 62 human diseases that are primarily found in other animals, Will Kastens of Harvard found that 35 came from wild non-primate mammals, about a dozen from domesticated mammals, and seven from non-human primates. A few came from birds (who are, like mammals, warm-blooded vertebrates), with only a scattering from other species (such as cholera-causing *Vibrio* bacteria, which are associated with marine plankton and shellfish).

Animal diseases get into human bodies in a variety of ways. In the case of Lassa and hantavirus, close contact with rodents leads to humans inhaling airborne particles from rodent feces or urine that contain the viruses. Other diseases, such as Lyme disease and the many mosquito-vectored diseases (malaria, yellow fever, dengue fever, Rift Valley fever, encephalitis), are introduced by a biting arthropod (in the case of viruses, such disorders are known as “arboviruses”, short for arthropod-borne viruses). In other cases, the pathogens get into human hosts when humans kill and eat the animal host. The harsh environment of the human gut probably kills most ingested pathogens, but in preparing a rat or monkey for consumption, a hunter gets blood and other contaminants from the animal on himself, which may enter the human bloodstream via cuts or across various membranes. This is almost certainly how the Ebola and AIDS viruses first entered the human system. (The Ivory Coast chimpanzees devastated by Ebola were famous for being enthusiastic and successful predators on the local monkeys, which they killed and tore apart before eating.) Or a wild mammal may bite a human, directly injecting pathogens (as in rabies).

Modern cultural practices have opened up new ports of access. About a dozen Britons have now died from the new variant form of Creutzfeldt-Jakob disease that they almost certain-

ly acquired by eating beef contaminated with the mysterious prions (“proteinaceous infectious particles”) that have caused thousands of cases of “mad cow disease” in British cattle since the mid-1980s. The cattle, in turn, almost certainly became infected by being fed animal protein containing sheep by-products (sheep having long been affected by a similar disorder called scrapie). (In the 1950s, a

...close contact with rodents leads to humans inhaling airborne particles from rodent feces or urine that contain viruses.

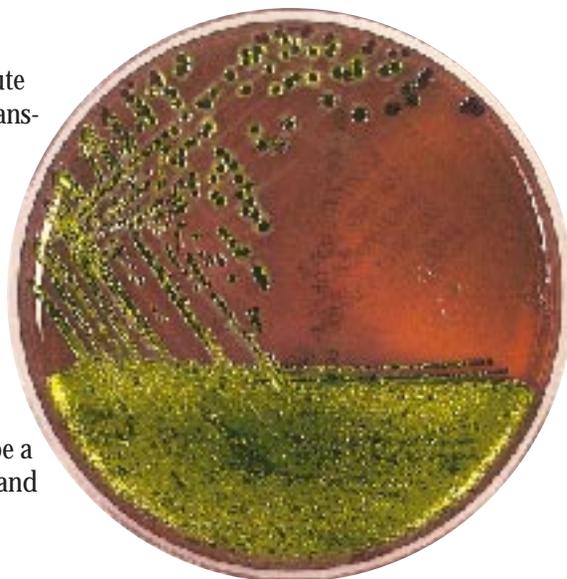
tribe in the Papua New Guinea highlands suffered 2,600 cases of a similar disorder, called kuru, which was almost entirely restricted to women and children who had participated in ritual burial handling of dead relatives; these rituals may or may not have included cannibalism of the brains of the dead; whence the kuru agent came when it first infected the tribe is not known, but seems likely to have been some local animal that was killed and eaten.)

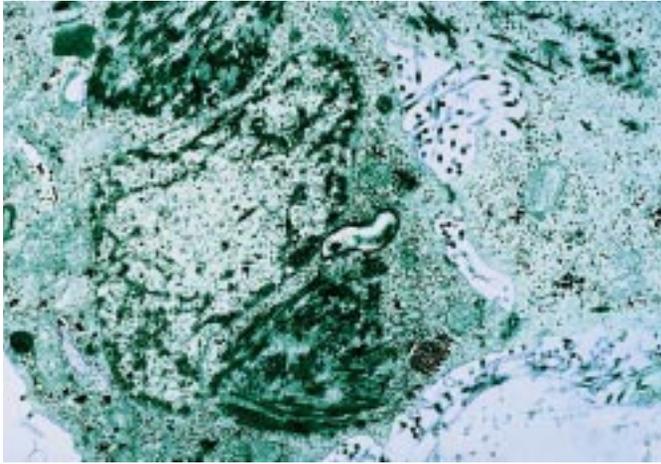
A worrisome possible new route for new pathogens is via “xenotransplants.” There have already been several cases of primate hearts or livers being transplanted into human patients as stop-gap measures until a human organ was available. Due to the perpetual shortage of human organs for patients who need them, several companies are developing new strains of pigs, specially bred to be a source of organs to be harvested and

transplanted into human patients. However, pigs (and all other proposed donor species) harbor various herpesviruses and retroviruses that, while not causing serious disease in pigs, might do so in humans. In Britain, pig-human transplants have been banned for now, until further research is carried out to assess the risk of introducing new diseases into human populations, and until a U. K. Xenotransplantation Interim Regulatory Authority develops guidelines.

An important constant in all of the cases mentioned thus far, and in many others, is human action. When we ponder the effects of the human assault on the natural world, we usually focus on such factors as climate change, air and water pollution, soil erosion and reduction in biodiversity. But rarely are the disease consequences of our actions considered. As rain forest is invaded by colonizing human populations, there is increasing contact between these populations and wild animals carrying potential new human pathogens — more people get bitten by mammals or insects, more monkeys and rodents are killed

The E. coli bacteria in the petri dish show a green sheen. (Slide courtesy of Stephen J. Cavalieri, Ph.D., associate professor of pathology and director of microbiology at Creighton.)





An Ebola infection (left) and the Ebola virus are pictured above. While the animal origin of the deadly Ebola virus has not yet been identified, many scientists suspect bats, rodents or monkeys.

and sold in local markets, more human huts and shacks are invaded by opportunistic local rodents. The likelihood of new zoonoses emerging is greatly accelerated.

To this general phenomenon, specific human actions can be added. Lyme disease, probably present for hundreds of years in northeastern North America at very low rates, exploded after humans cleared the forests and eliminated large predators, farmed these areas for a couple of hundred years, then abandoned them for the fertile prairies farther west. In the second-growth forests that sprang up, white-tailed deer populations exploded (ideal habitat, no predators), allowing the deer tick with its deer-mouse/deer life cycle (and its cargo of Lyme disease bacteria) to explode in numbers as well. As suburbanites pushed into these wooded and wild areas, they encountered the abundant deer ticks and, from their bites, Lyme disease bacteria. In Argentina, native pampas grasslands were replaced by intensive cultivation of corn; in cornfields, a new dominant mouse replaced a different species that had predominated in the grasslands. The new species (*Calomys musculinus*) turns out to be the host of the Junin virus, cause of Argentine hemorrhagic fever, which has caused many deaths

in agricultural workers. In Africa, building of the Aswan Dam in Egypt was followed by 200,000 cases of Rift Valley fever and 600 deaths in the 1970s (the disease continues today): The building of the dam created abundant new habitat for the mosquito

Human activities provide new opportunities for people to come into contact with potential pathogens and greatly facilitate the spread of these pathogens... to the worldwide human population.

vector of the virus, and brought into the area new large populations of humans and livestock who could be infected (cattle and sheep are major animal hosts).

Other cases abound. *Legionella*, the bacterium that causes Legionnaires' disease, has lived for millennia in

lakes and ponds without affecting humans — if people swallowed *Legionella*, their guts made short work of the bacteria. But invention of giant institutional air conditioners with reservoirs of water to remove heat opened up a new niche for *Legionella*, with powerful vents to distribute it aerially via water droplets, getting into people's lungs and bypassing their guts. Invention of a new extended-use tampon in the 1970s created the perfect environment for the survival and growth of toxic-shock-syndrome-causing *Staphylococcus*.

Human activities not only provide new opportunities for people to come into contact with potential pathogens, they also greatly facilitate the spread of these pathogens out of their location of origin to the worldwide human population. It is quite likely that HIV had occasionally been getting into human populations in central Africa for many centuries, causing a small number of mysterious, lingering deaths in isolated villages. However, in the 1970s, political upheaval, increasing urbanization and large-scale movements of migrant laborers (often single males who visited urban prostitutes frequently) coincided with the building of a highway that, for the first time, ran all the way across central Africa from Kinshasa,

Congo, on the west to Mombasa, Kenya, on the east. These mass movements of people, facilitated by the presence of what has come to be called “the AIDS highway,” ensured that this mysterious intermittently present ailment escaped its former boundaries and entered major African urban areas. Easy intercontinental movement of people, made possible by modern airplane travel, then provided the opportunity for HIV to get out of Africa and spread to the rest of the world.

While AIDS has a very long latency, allowing it to get established outside Africa before it began to reveal its fatal presence, it also is important to realize the extent to which modern air travel has the potential to facilitate the spread of other, much faster-acting emerging diseases. As a saying goes, with modern air travel nobody in the world is more than 24 hours from the rain forest. Hundreds of cases of tropical diseases enter Britain each year via Heathrow Airport; over a hundred cases a year of dengue fever are reported in the U.S. among travelers returning from the Caribbean (which makes the spread into the U. S. of several good mosquito vectors of this disease very disturbing); a few years ago a man died in Chicago of Lassa fever, contracted when he was in Nigeria for a funeral.

A reader of recent popular books or sensationalized movies may doubt the doomsday scenarios they propose, in which a hypothetical new tropical disease quickly spreads throughout the world and, with Ebola-type mortality rates, threatens the very existence of the human species. But history provides many examples of just such devastation when an immunologically naive population is suddenly exposed to human disease-causing pathogens from another part of the world. In the most famous case, American people from the Arctic to Tierra del Fuego were decimated by Old World dis-

eases brought by European conquerors and their African slaves. Smallpox, measles, yellow fever, malaria, and many others swept through Native American populations for several centuries, often causing 50-90 percent mortality in particular locations. Some estimates suggest that Old World diseases reduced an original pre-Columbian population in the Americas from 100 million to only about 10 million a century after contact.

And if emerging diseases weren't bad enough, old familiar enemies also seem to be making a comeback, in new and deadlier forms. The popular news media have recently begun to spread alarmist stories about tuberculosis strains that are resistant to all known antibiotics and about “flesh-eating *Staphylococcus*.” While many of these stories are over-sensationalized, they do reflect a real problem. Antibiotic-resistant forms of such old enemies as *Mycobacterium tuberculosis* and *Staphylococcus aureus* are presenting very serious new challenges; every major disease-causing bacterium is

resistant to at least one antibiotic, and many are resistant to all but one or two. And new, deadly forms of previously innocuous microbes are also popping up, such as the 0157:H7 strain of *Escherichia coli*, the ubiquitous human colon bacterium. This new strain, first discovered in 1982, has since been involved in deadly outbreaks of food poisoning involving contaminated fast-food hamburgers in the United States and contaminated school-lunch salads in Japan.

The appearance of such new “superbugs” involves two phenomena, one that should have been immediately predicted by anyone understanding the process of evolution, the other a more surprising phenomenon only fully revealed by modern molecular biology. The first involves simple natural selection. When antibiotics are first used against a bacterial species, most individual bacteria are susceptible and quickly killed. However, a tiny minority of the bacteria usually have, by coincidence, partial or full resistance to the antibiotic. Under the severe selection



As humans continue to encroach on the rain forest, there is greater likelihood of people coming into contact with wild animals carrying potential new human pathogens. With air travel, nobody is more than 24 hours from the rain forest.

This and all screened photos ©Aris Multimedia Entertainment, Inc. 1993

imposed by antibiotic use, this tiny minority are the only survivors. With their competition eliminated, they can grow explosively and become the predominant form in an environment (such as a hospital) where antibiotics are pervasive. Even where already-resistant forms don't exist, mutations leading to resistant forms are likely to occur, since bacteria exist in enormously large populations and have very short generation times. Under ideal circumstances, some bacteria can duplicate themselves every 20 minutes — at that rate, a bacterial species goes through as many generations in a day as humans do in a millennium. It is not just possible, but essentially inevitable, that microbes will evolve resistance to any new antibiotic; the best modern medicine can hope to do is to follow careful procedures that delay this inevitable outcome.

Similar arguments apply in the case of pathogens other than bacteria. The trypanosomes that cause sleeping sickness and the *Plasmodium* species (protozoans, both) that cause malaria rapidly change their outer proteins so that the human immune system and human vaccine developers are unable to keep pace. Retroviruses such as HIV are also notoriously fast evolvers. One theory (not accepted by the entire AIDS medical community) for why most AIDS sufferers usually succumb is that HIV and the patient's immune system engage in a prolonged arms race, with HIV constantly generating new versions and the patient's immune system having to match that with new defenses — under this scenario, almost inevitably at some point an HIV variant arises that the immune system never is able to cope with, and the disease progresses to the patient's death. In 10 years in a patient's body, HIV can undergo as much genetic change as has happened in humans since the early hominid "Lucy" walked the savannas 3 million years ago.

The second trick that leads to the spread of antibiotic resistance and to the generation of new "superbugs" is a phenomenon called "horizontal gene transfer." Bacteria have many ways of picking up new genes. One involves the acquisition of small, circular pieces of DNA called plasmids, which may be transferred during bacterial "mating" or picked up from other bacteria that release them into the environment. Such plasmids often contain genes for antibiotic resistance or for toxin production, and bacteria of one species can incorporate these plasmids

In 10 years in a patient's body, HIV can undergo as much genetic change as has happened in humans since the early hominid "Lucy" walked the savannas 3 million years ago.

not only from other bacteria of their own species but from other species as well. Thus, a non-resistant species of bacteria can quickly acquire antibiotic resistance from a resistant species that shares its environment (such as the gut or bloodstream of a human or a domesticated animal), or an innocuous bacterium can acquire genes for making deadly toxins from another species in the same way. The O157:H7 *E. coli* strain picked up its deadly toxin gene in this way from another food-poisoning pathogen, *Shigella dysenteriae*, which lives alongside it in such environments as the guts of cattle.

As in the previous case of newly emerging zoonotic diseases, human actions have made the processes of

antibiotic-resistance and virulence acquisition much worse than they otherwise might have been. Particularly damaging has been the widespread use of antibiotics in less-than-critical situations. The more widespread antibiotics are in the environment, the more quickly resistance to them will evolve and prevail in a bacterial species. Having evolved in a domestic animal, given antibiotics as a routine practice to promote faster weight gain, or in a human patient with a viral infection (against which antibiotics do not help), a resistant strain can then enter and cause serious illness in humans. As a parent myself, I know just how tempting it is to insist that a child with a fever and a sore throat be given an antibiotic, even if what the child has is probably a viral infection. And, living most of my life in Kansas and Nebraska, I can understand why cattle producers wish to eliminate nagging health problems that slow weight gain and limit profits. But each of these situations greatly exacerbates the problem of antibiotic resistance. (In the U.S., 30 times as many antibiotics are used on farm animals as on humans; in Denmark in 1993, 22 kg of vancomycin were used in human therapy, 19,000 kg in animals.)

Are we helpless against emerging and re-emerging diseases? Not at all, although to better protect ourselves we have to be constantly aware of the risks they pose and the ways in which human actions affect those risks. The public health consequences of human intrusion into the natural world, especially in the tropics, need to be explicitly considered. Perhaps each new development project should be accompanied by not only an ecological impact statement but also an epidemiological impact statement. Well-funded research should be undertaken to survey the microbial biota of wild animals, to identify potentially emerging pathogens. Research should also focus on pathways of "microbe traffic," so



Workers process ground beef at the former Hudson Foods plant in Columbus, Neb., last August. Concern of a possible E. coli bacteria contamination prompted a 25 million pound recall of beef processed at the plant.

that a better understanding exists of how new pathogens get into local human populations and spread from their original foci to new areas. International organizations should be established to make public health monitoring and record keeping as good in all parts of the world as it is in the U. S. With our network of local, state, and federal public health agencies, anchored by the Centers for Disease Control in Atlanta, only 19 days elapsed in 1993 between the first case of hantavirus pulmonary syndrome showing up in a doctor's office and the identification of the new hantavirus that was the cause of the disease. In this age of political

conservatism, government budget cut-backs and lack of enthusiasm for the funding of international agencies, it will be difficult to establish such programs, but we should never forget

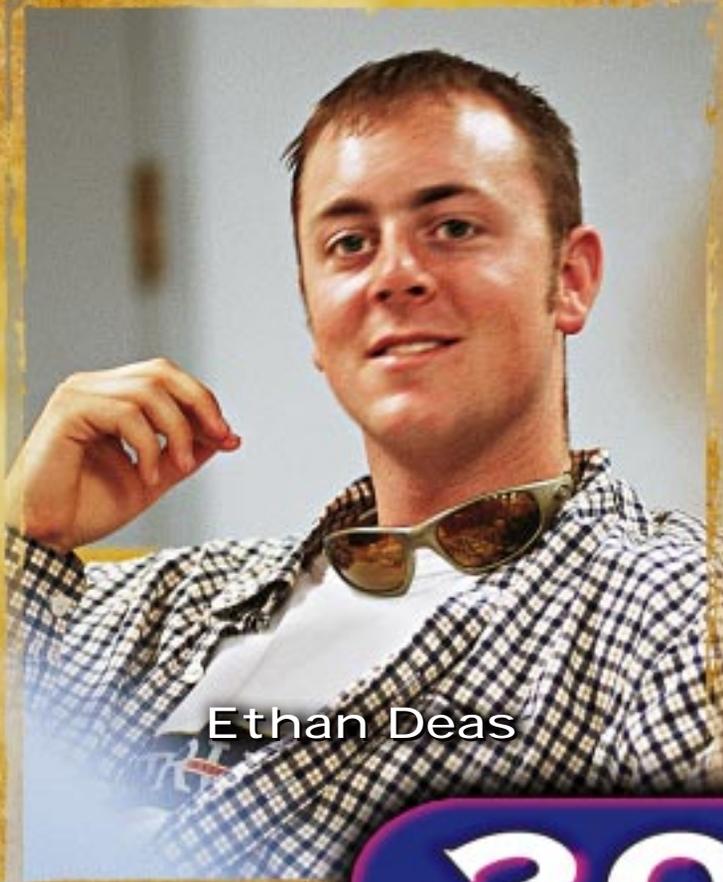
The more widespread antibiotics are in the environment, the more quickly resistance to them will evolve and prevail in a bacterial species.

that all of us are within 24 hours of the rain forest.

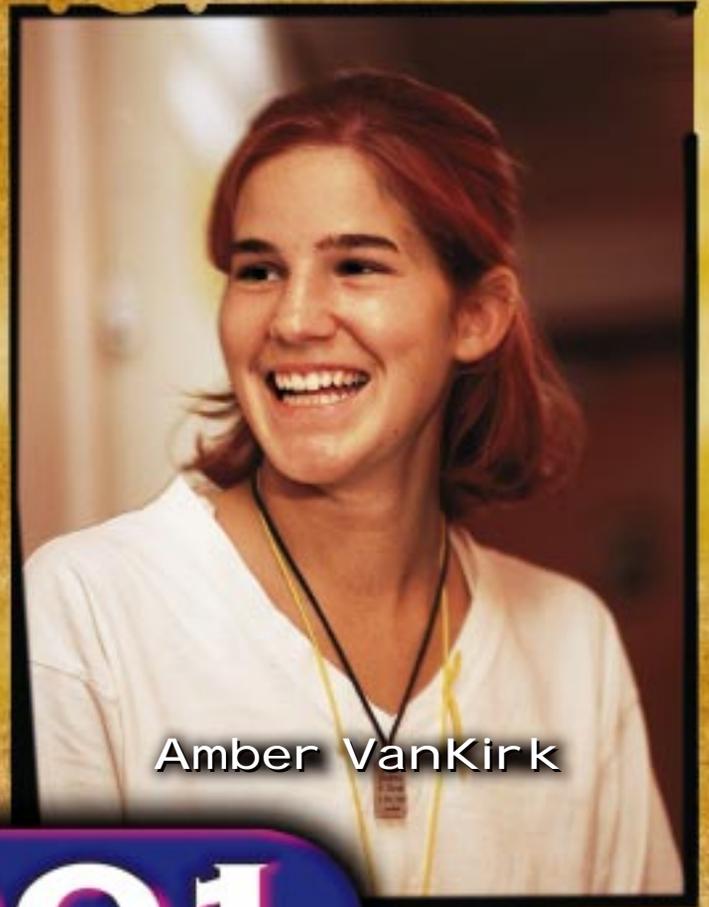
In addition, an explicitly evolutionary approach, sometimes called by its supporters "Darwinian medicine," should guide our use of antibiotics, making sure we follow procedures that allow us to husband the valuable resource of antibiotic effectiveness and make it last as long as possible. And, where diseases are already established, it may be possible to use procedures developed by proponents of Darwinian medicine to give less virulent strains of pathogens an evolutionary advantage over more deadly strains (See Randolph Neese and George Williams' recent book, "Why We Get Sick: the New Science of Darwinian Medicine," for details.)

Above all, we must be prepared to carry on the fight against infectious diseases over the long term; there will never be a quick fix or a permanent solution. In 1982, following the string of new diseases that had first appeared or been recognized in the 1970s, Dr. Richard Krause of the National Institutes of Health was asked to testify before House Appropriations Committee hearings about the budget for NIH's National Institute of Allergy and Infectious Disease. Congressman Joseph Early asked Krause, "Has something new occurred? Why do we have so many new infectious diseases?" Krause's reply can be our warning: "No, nothing new has happened. Plagues are as certain as death and taxes."

Final Note: Since this article was begun, Nebraska and Iowa have both seen their first cases of hantavirus pulmonary syndrome (the Iowa case was fatal), and there has been a nationwide scare concerning frozen hamburger patties originating from a Columbus, Neb., food-packing plant that were contaminated with the 0157:H7 strain of the E. coli bacterium. **W**



Ethan Deas

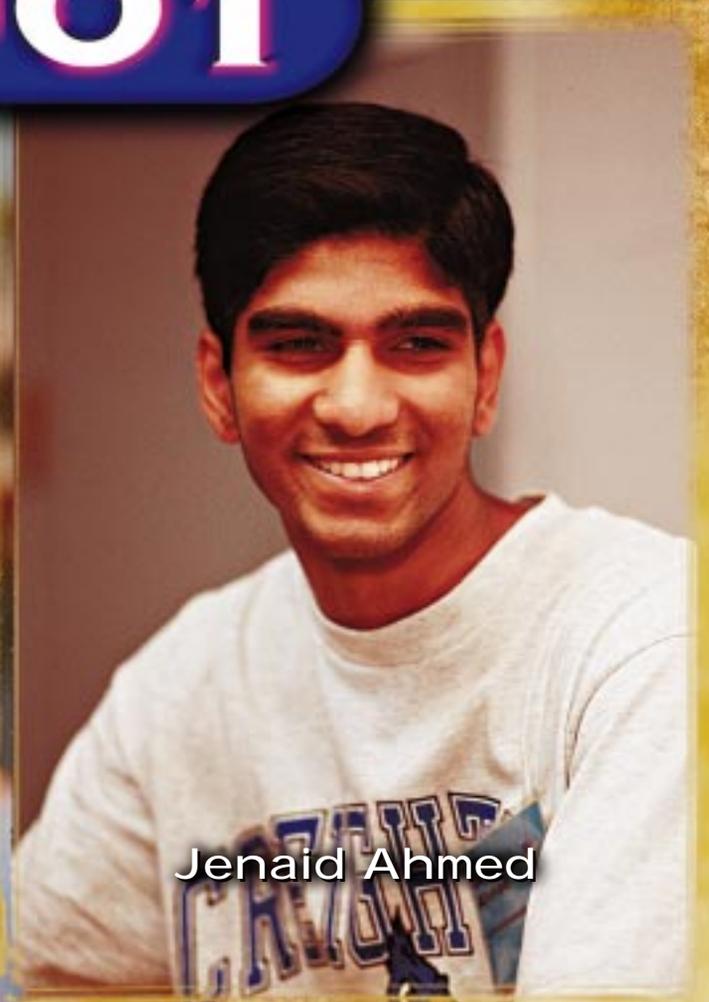


Amber VanKirk

2001



Kel I y Kennedy



Jenaid Ahmed

THE CLASS OF 2001: A New Odyssey for Creighton

By Eileen Wirth, Ph.D.

Associate Professor, Journalism and Mass Communication

Proudly wearing a new Creighton T-shirt, Jenaid Ahmed of the Chicago area joined the controlled confusion at lower St. John's and patiently waited his turn to speak to his freshman seminar adviser. It was the culmination of summer preview for Creighton's Class of 2001.

Ahmed, a pre-med major whose mother is an immigrant physician from India, symbolizes some of the major changes that the class is bringing to Creighton.

According to C.U. admissions and student services officials, this class:

- Includes sharply increasing numbers of Asian Americans, especially of Indian or Pakistani descent.
- Has very high numbers of pre-med majors attracted by the Guaranteed Admissions program.
- Includes more students whose parents have more than a bachelor's degree.
- Has fewer Roman Catholics and more members of other faiths including non-Christian faith traditions.

Like many members of the Class of 2001, Ahmed said that the Guaranteed

Admissions program (which began in 1996 and guarantees admission to three of the five professional schools to C.U. graduates meeting certain standards) was a major factor in his choice of Creighton. However, it wasn't the only reason.



Making a residence hall room home is Creighton freshman Juan Baltodano.

"Creighton is full of opportunities," he said. "It's like a buffet. It's compact. I know where everything is. The atmosphere is very welcoming and friendly." On a campus visit, he "saw the interaction in the halls. The teachers seemed so friendly."

Ahmed said he has attended Loyola Prep in Chicago so he is familiar with Jesuit education. His college plans include more than just studying to get into medical school.

"I'm interested in community service and maybe some of the leadership activities," he said. "I plan to play intramural basketball."

According to Director of Admissions Laurie Galeski, 21 percent of this year's approximately 875 freshmen are members of minority groups, the bulk of them Asian Americans.

While exact ethnic percentages of the Class of 2001 were not available at midsummer, Galeski said she expected the figures to be fairly similar to those of the Class of 2000 when 14 percent of the freshmen were Asian Americans.

This represents a sharp increase



Settling in to Swanson Hall are, left, Abraham Daniels, and, right, Mital Patel.

from the 5 percent Asian American freshman enrollment in 1991 and the 9 percent Asian American enrollment in 1995, the year prior to Creighton's Guaranteed Admissions program, said Dr. Stephanie Wernig, associate vice president for student services.

Wernig said increasing numbers of students of Indian and Pakistani descent are selecting C.U. especially for this reason. Many new students are the children of immigrant doctors and other professionals.

This factor has sharply increased the parental educational backgrounds of Creighton students since 1987, she said. For example, in 1996, 68 percent of the freshmen said their fathers had a B.A. or higher as well as 60 percent of their mothers. This contrasts with 56 percent of the fathers and 48 per-

cent of the mothers in 1987.

The great jump came in 1996. In 1995, the year before the Guaranteed Admissions program for students meeting certain grade criteria, 62 percent of the fathers and 53 percent of the mothers had more than a B.A.

The Guaranteed Admissions program has increased Creighton's traditionally high percentage of students planning health sciences careers, Wernig said. In 1996, 40 percent of the freshmen said they planned medical or dental careers, up from 30 percent in 1995 and 21 percent in 1987. In contrast, the percentage of students who planned to attend law school dropped from 14 to 7 percent between 1987 and 1996.

The increase in prospective pre-medical students was reflected in the

students filling the benches at lower St. John's at summer preview.

Amanda Nierstheimer, 18, of Pekin, Ill., and Ethan Deas, 18, a graduate of Omaha Burke High, were among those getting acquainted as they waited to see their advisers. Both are pre-med, and guaranteed admissions helped draw both to Creighton. However, like Ahmed, Nierstheimer and Deas also considered other factors.

"For me, Creighton's location was number one and also its academic reputation," said Deas.

Like many Omaha students, he said he's been weighing the relative advantages of saving money by living at home versus the chance to meet more people by living on campus.

"I would like to join a fraternity

and participate in some intramural sports and clubs,” he said. “I’m excited. I’m ready to get going…”

Nierstheimer said Creighton’s size and the recommendation of a friend who went here affected her choice. Creighton is big enough that there will be plenty to do but not so big that she’ll get lost in the crowds. A campus visit in February solidified her choice.

“Everyone I met seemed really happy,” she said. Her interests include intramural swimming and leadership activities. She’s also impressed by Creighton’s level of computerization and unlimited Internet access.

“I was scared before I came for this (summer preview) that I wouldn’t find my way around or know anyone,” she said. “Now I’m just excited.”

According to Jack Walsh, assistant dean of the College of Arts and Sciences, many students are attracted by the variety of health career programs at Creighton.

“Students have a lot of different ways to go,” he said. “They like the fact we’ve got three undergraduate colleges they can go to. If they don’t make it in one place, they can go someplace else.”

And, indeed, not all the prospective health care professionals at preview were pre-med. Lora Hill, 17, from Timnatu, Colo., for example, plans to become a physical therapist.

“I liked the campus and its size,” she said. “Creighton has a good reputation for physical therapy. I don’t know anyone here, but it’s fun to be in a new place.”

Across campus, away from the hubbub at St. John’s, sat Amber VanKirk of Lincoln, waiting to meet with her adviser in the School of Nursing.

VanKirk, a graduate of Lincoln’s Pius X High School, said she chose Creighton because of the reputation of the nursing program and because her sister Shana, an Arts and Sciences sophomore, has been happy at C.U.

“I like the fact that it’s small,” she said. “I know the teachers will be helping me out. I knew the nursing

program here was very, very good.”

VanKirk said she hopes to work with people who are less fortunate — “really sick people or poor people. I think that going on service trips is one thing I’m definitely interested in at Creighton.”

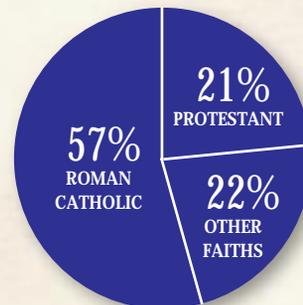
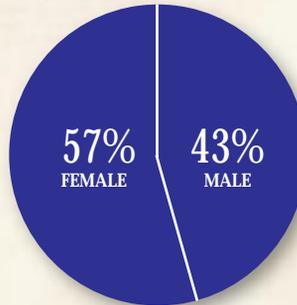
According to Galeski, admissions to the School of Nursing have dropped, reflecting a national trend. However, prospective business students have increased by about 34 per-

cent, an extremely welcome change for the College of Business Administration which has worked hard to halt an enrollment decline.

COBA freshmen such as Christopher Wilmes, 18, of Allen, Neb., met with their advisers at the College of Business Administration.

Wilmes said he plans to major in management information systems and chose Creighton partially because of its reputation and because he received

A PROFILE OF THE UNDERGRADUATE CLASS OF 2001: A THUMBNAIL



- Approximately 875 students
- Natives of 39 states and numerous foreign countries
- Average ACT score of 25.5

Here are some comparisons between the things the classes of 1987 and 1996 considered either very important or essential:

<u>1987</u>		<u>1996</u>
25%	Influence politics	19%
43%	Influence social values	40%
65%	Help others in difficulty	74%
80%	Become an authority in my field	68%
10%	Make theoretical contribution to science	28%
14%	Write original works	10%
13%	Create artistic works	9%
50%	Become successful in own business	35%
32%	Promote racial understanding	37%

Source: Creighton Student Services



Assistant Professor George McNary consults with College of Business Freshman Jennifer Lee during Creighton's summer preview.

the Walter and Suzanne Scott Scholarship. In addition, his parents were eager for him to attend a Christian university.

"Hopefully, I will become a computer systems analyst," he said. "That's my idea right now — or (I may do) something in business in general. I believe that I will have a job in computers that is high paying and will give me the chance to travel. That's the dream I have..."

One of Creighton's major goals, said Galeski, is to recruit additional students in fields outside the health sciences. "We're doing direct mailings and specialized programs to increase enrollment in some of our other areas but in many guidance counselors' minds, the health sciences are what Creighton is best known for."

Incoming Fine Arts major Melinda McGuffee of Papillion, Neb., said she chose Creighton for a combination of reasons including proximity to home, its academic reputation and financial

assistance. She might also take public relations courses to enhance her career opportunities.

Meeting Dr. Roger Aiken, chair of Fine Arts, got her really excited about Creighton. "He was the coolest guy in the world," said McGuffee, who is especially interested in Aiken's specialty, art history.

Another example of an Arts and Sciences student enrolling at Creighton for its other programs is Kelly Kennedy, 18, of Bellevue, who plans to major in journalism. Kennedy, who edited the Bellevue East High School newspaper and received a number of journalism awards, said that receiving a Mildred Brown Scholarship in journalism drew her to C.U.

Her plans include living on campus, working on the *Creightonian* student newspaper, getting active in the Creighton University African-American Student Association and possibly studying abroad. "The semester in the Dominican Republic

appeals to me."

Kennedy said that she had been a little scared that in college she would not experience the closeness that she found on her high school newspaper staff. However, she found a similar atmosphere when she received her scholarship at Creighton's journalism awards banquet last spring.

Galeski said that Creighton still draws many children of alums and is increasing its efforts to attract such students. It sends out special mailings to alum families. Last year, it added a mailing to 500 alumni with a waiver of the application fee as a reward for their help with student recruitment.

"Alumni assist us now in a lot of areas," she said. "We want to work with them more closely. They can certainly be strong, influential factors in a student's decision-making process."

Galeski said that Creighton also has increased its efforts to attract students from Jesuit high schools by visiting 39 of the nation's 46 Jesuit secondary schools. Creighton Jesuits personally call accepted students from such schools, urging them to enroll. This year, there's been a 34 percent increase in deposits from such students. In addition, Creighton moved to first place as the choice of 1997 graduates of Creighton Prep. It had fallen to second or third (behind the University of Nebraska-Lincoln and the University of Nebraska at Omaha) in recent years.

Overall, admissions and University officials say they are delighted with the quality of the Class of 2001. It is smarter than ever with 36.3 percent of domestic ranked students coming from the top 10 percent of their high school class, compared to 34.7 percent last year. Incoming freshmen also seem to be enthusiastic, said Assistant Dean Walsh, who worked with all three preview groups.

Wernig said that Creighton's growing diversity poses a number of challenges. The percentage of students who describe themselves as Roman Catholic on the freshman survey has dropped from 75 percent in 1987 to 59

percent last year and is expected to be about 57 percent this year. Growing numbers of students are born-again Christians, Buddhists or Moslems.

In addition, she said, Creighton students seem to be more conservative politically. While about half the students still consider themselves middle of the road politically, 29 percent of the 1996 freshmen listed themselves as conservative versus 24 percent in 1987. Those calling themselves liberal dropped from 27 percent to 18 percent.

"As we get more diverse, maintain-

ing and teaching our traditional Creighton value system gets more challenging," said Wernig. "This presents a special challenge to Jesuit colleges and universities where social justice and leadership development are considered a vital part of each institution's mission."

Galeski emphasized that Creighton's increasing academic credentials should not discourage students from applying. Creighton still welcomes students who were neither valedictorians nor scored in the 30s on their ACT tests, especially if

they have other qualities of leadership and service.

Galeski said Admissions wants to talk to all students who think Creighton may be a good match for them. It is open to good students of all backgrounds who may bring a variety of gifts to the Creighton community.

Creighton normally admits students with at least a C plus average from a good college prep school and an ACT of 22 or higher, she said. The admissions process is highly personalized and considers all components of a student's background.

ALUMNI REFLECT ON THEIR OWN CREIGHTON 'ODYSSEYS'

In the late 1940s when Harry Dolphin enrolled at Creighton, he expected to get a good education in journalism, then make up for the three years he had lost to Army service in World War II.

Dolphin, a retired Omaha public relations executive, said he and other veterans took advantage of the GI Bill and other programs to get far better educations than they otherwise would have had.

"We were making up for lost time," said Dolphin. "We wanted to get a good education as fast as possible." Taking 17 hours was considered a light load. Going to school year round was not unusual.

Like Dolphin, three other alumni from different decades said the eras in which they attended Creighton shaped both their expectations and their experiences.

John Reefe, an Omaha attorney who received his B.A. in 1958, recalled the 1950s as a time of traditional values and little worry about competition.

"People were pretty relaxed about going to school," he said. Jobs were plentiful and "no one I knew was real frightened about the future."

Reefe said that when he entered Creighton, his goal was to be "in the middle of the pack or a little ahead of it but without doing much work."

There was no law school entrance exam, he said. Students merely had to promise to pay their tuition eventually. Reefe graduated from C.U. Law School in 1963.

The 1960s, by contrast, were a time when many entering Creighton students were interested in the civil rights and peace movements, said Elizabeth Rea, an Omaha teacher who transferred to Creighton from a junior college in Iowa in 1967.

Rea, vice president of the Omaha Education Association,

said she had been inspired by John F. Kennedy and went to college expecting that "part of life was to make some difference" in society. Dr. Richard Shugrue, who then taught political science, was faculty adviser to the Young Democrats which she joined. He encouraged members to "get active and get involved.

"I loved it," she said. "It was one of the best times of my life."

By the early 1970s, fear of the draft was a motivator for many incoming Creighton students, at least male students, said John Rosenthal, treasurer of a commercial finance company in the Chicago area.

Rosenthal, who received a B.A. in math in 1973, said that his draft lottery number was seven. Throughout college, he worried that failing to finish one-eighth of his graduation requirements every semester might result in loss of his student deferment.

"You couldn't change majors or colleges or you risked becoming cannon fodder," he said.

Rosenthal said that students who entered C.U. in the early '70s had different expectations depending on which faction they exemplified. There were racial divisions. Some students were intensely political while "the rest were intensely not political."

Some parents sent their children to Creighton from the East Coast on the assumption that they couldn't get into trouble in Omaha. The FBI occasionally sent agents to campus looking for drug users and dealers.

"It wasn't politically correct to worry about a job," said Rosenthal. "That would have meant you were selling out. Everyone wanted to get a job because you had to have one, but a career meant that you had bought into the system." **W**

A Spirituality OF WORK FOR BUSY PEOPLE

By Joseph Allegretti, J.D., M.Div.
Yossem Professor of Legal Ethics
Creighton University School of Law



It's a Monday evening at a Catholic church in Omaha. A dozen people are sitting around a table. They range in age from the 20s to the 70s. They are men and women, black and white. They have gathered to talk about their work, their faith and the connections between the two.

- A stay-at-home mother of three says, "I want to find time for prayer but I can't. My days are just too busy taking care of my kids."

- "I love my work," says a high school teacher. "I know I'm doing something important with my life."

- A doctor tells the group, "I worry

that my medical practice is taking over my life. All I do is work."

- A computer programmer complains about the lack of meaning in his job. "I spend eight hours a day punching information into a computer. I don't feel like I'm doing anything for anyone."

Spirituality and Work

Teachers, bankers, plumbers, lawyers, accountants, homemakers and real estate brokers — the work is diverse, but the concerns are similar. People are struggling to find a way to link their work with their deepest values. They do not want to feel like one person at church or synagogue on the weekend and a different person at work during the weekday. They are hungry to connect their faith and their work.

Each of these people, in his or her own way, is trying to fashion a spirituality of work. Some people dismiss spirituality as the very antithesis of the everyday world of work, commerce and family. Literally, however, spirituality means to be “under the influence of the spirit.” As Richard P. McBrien puts it in “Catholicism,” “spirituality has to do with our way of being religious.” Our spirituality relates to how we experience God in our life and respond to that experience. It is not abstract, otherworldly or impractical. It is how we are who we are.

A spirituality of work, then, seeks to relate our work to the rest of our spiritual life. It invites us to open ourselves to the presence of God in our work. It looks for opportunities to make our work an instrument of service to God and to neighbor.

As we cultivate a spirituality of work, we guard against the twin temptations toward devaluing our work (treating it as spiritually meaningless) or overvaluing our work (giving it too much meaning). In the first case, we damn our work as a curse; in the latter, we transform it into an idol.

‘Cursed is the Ground’

We treat our work as a curse any time we approach it as nothing more than a grim necessity, without any inherent meaning, valuable only for the paycheck it may (or may not) bring.

Many people I talk to fall into this trap. Some of them earn large salaries and live in the nicest of neighborhoods. Yet their work is nothing but a

painful chore — it provides no sustenance for their souls, no bread for their spiritual journeys. Often the faces of such people brighten up — lighten up! — the moment the discussion changes to what is really important in their lives, whether it be family, church or sports.

What is most pernicious about this attitude is its effect upon the worker. When I approach my work as a curse, it diminishes my own value. Here I am, spending hour after hour, day after day, month after month, year after year, engaged in aimless and hollow activity which is irrelevant to the deeper yearnings of my heart and soul. But if my work is a curse, what does this say about me? Over time I may come to hate myself for wasting my talents and my life. Often this self-hatred is driven underground only to re-emerge in the guise of substance abuse or other destructive behavior.

Ironically, religion itself has contributed to a negative assessment of ordinary work. In Genesis 3, God tells Adam and Eve, “Cursed is the ground because of you. In toil you shall eat of it all the days of your life; thorns and thistles it shall bring forth to you and you shall eat the plants of the field. In the sweat of your face, you shall eat bread.” Work, back-breaking, mind-numbing work, is God’s punishment for the primeval, original sin of humanity. (There is another, more positive, picture of work in Genesis, but it’s God’s curse that sticks in most people’s minds.)

More subtly, religion in the West has sometimes encouraged the mistaken notion that God and the spiritual life are reserved for Sundays and special days, with the unfortunate effect of trivializing the value of our everyday lives. Too often spirituality in the West has been viewed as something that you can do only if you flee from ordinary life.

In the Middle Ages, for example, it was often assumed that no one who remained in the secular world could live out the richness of the Christian faith. As we shall see, both Protestants and Catholics now reject such a deval-

uation of ordinary work, but the remnants of the medieval view haunt us still. To go on a retreat, sit quietly in church, attend liturgy, read the Bible, meditate privately — that is spiritual. But time spent at work, or with the kids, fixing dinner, rushing to the veterinarian — many of us see that as secular, worldly, not spiritual at all.

“I want to find time for prayer but I can’t. My days are just too busy taking care of my kids.”

From this viewpoint, the long hours we spend at work are at best a waste of time and, at worst, a source of guilt and anxiety. We can never quite escape the fear that every moment spent at work distracts us from the real purpose of our lives — to deepen our relationship with God.

Most of us, of course, do not spend our entire lives hating our work or hating ourselves for working. But most of us experience times when we feel pressured and overwhelmed by our work. When this happens, our work seems to be devoid of meaning and estranged from the rest of our life, like a curse or punishment.

If you are like me, and sometimes find this happening, then you might ask yourself a few questions:

- To what extent have I internalized a negative view of work that finds it a distraction to my spiritual life?
- Do I sometimes hate my work or find it spiritually meaningless? Is there a certain situation or event that triggers this feeling?
- When I treat my work as a curse, what is the impact on the rest of my life? Do I become angry or depressed? Hard to get along with? Do I over-eat, over-drink, or spend long hours in front of the TV?
- What brings me out of this mindset? How do I recapture a sense of

meaning in my work?

If at times our work seems like a curse, the solution is to find ways to cultivate a sense of meaning in our work. We must take care, however, lest we avoid one trap only to fall into

Deep down we know that our work can't save us. It can't make everything better.

another — we need to find meaning in our work, to be sure, but not too much meaning, lest our work become not a curse but an idol.

The God Who Can't Save

If one view of work devalues its significance, and treats it as spiritually deadening, there is another attitude toward work that overvalues it, and threatens to transform it into something more than it is, something god-like, an idol made not of stone or clay but out of our dreams of worldly success and accomplishment. As the great Christian theologian Paul Tillich reminds us, in a practical sense our god is whomever or whatever we invest with ultimate worth, whoever

or whatever is most important in our life. Idolatry is confusing the finite with the infinite. Sometimes this happens with our work.

We confront here a paradox at the very heart of a healthy spirituality of work: Work is an important and integral part of our spiritual life, and should be taken seriously, but it is not of ultimate significance in our lives. Work should open us to God, not take the place of God.

How easy it is, however, to invest too much of ourselves in our work. I think of all the times when I have been burdened with assignments, frantically trying to finish them all, yet at the same time saying “yes” but never “no” to each new request. And it is never enough to complete my assignments — not only must I do them all, I must do them all perfectly. My work becomes a way of proclaiming to the world, “Look at me: I’m good! I count for something!”

I’m not alone in this. At a cocktail party, we break the ice with strangers by asking, “What do you do? Where do you work?” The size of our paycheck or our office frequently serves as a not-too-subtle sign of divine favor, proof that we’re somebody special.

When we approach our work this way, success or failure at work

becomes the chief test of our worth as a person. Who I am depends upon what I do. It’s easy to end up like the man I met who said, with a sigh, “All my life I’ve been an engineer. Now that I’m retired, I’m nothing.” And woe to the unemployed and the underemployed in a society like ours that enshrines work, accomplishment and productivity as the chief tests of a person’s worth!

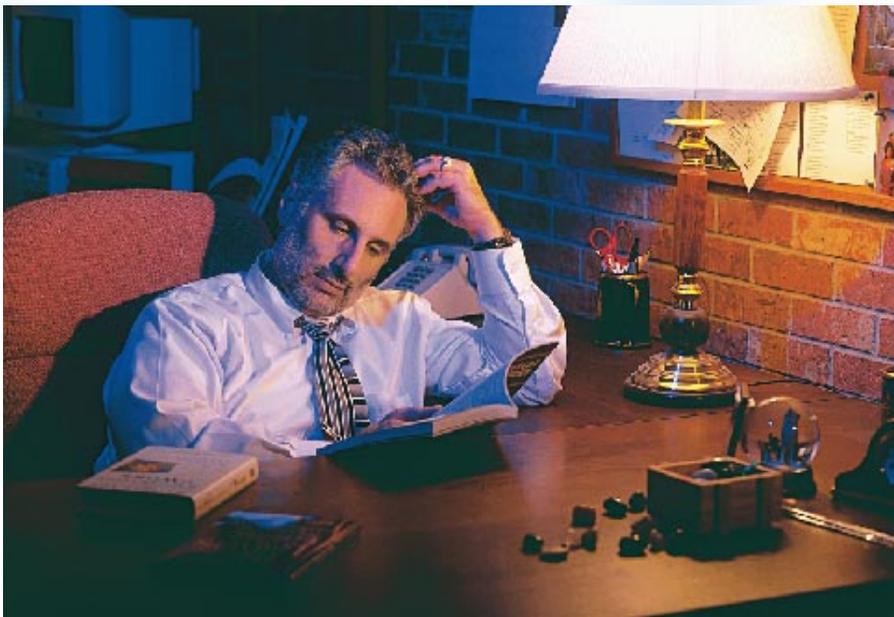
Work idolatry is an occupational hazard for many workers, but especially so for those who believe that they are doing “important” work. Many doctors, lawyers and business executives, for example, are over-achievers, workaholics, who place inflated value on their work in the hope that it will save them from their shadowy fears of emptiness and worthlessness.

For such people, work becomes their entire life. Everything else suffers — families and friends fall by the wayside, cherished hobbies are forgotten, their health is jeopardized — in their frantic efforts to work more, earn more, accomplish more. The broken marriages, the drug and alcohol problems, the push-push-push mentality that can never slow down — all are tangible signs of the vain quest to grasp the Holy Grail of the workplace.

The root of the problem is that we are trying to make our work into something that it cannot be. We are using it as a magic potion to convince us of our self-importance, a drug to take away the painful suspicion that without our accomplishments and our corner offices we are, at bottom, nothing.

There is no quick cure for this problem, but the first step is to admit our tendency toward work idolatry. This is a fact of life for most of us, to a greater or lesser extent, because our work does matter. It does make a difference to us if we do it well or poorly. If our work had no meaning, it would be a curse.

So let us admit that our work is important and is inextricably entangled with our self-identity. Problems arise not when our work is meaning-



Allegritti... "We need a spirituality of the ordinary."

ful but when it assumes ultimate meaning in our lives, when we worship it as a god.

If you are prone to work idolatry, as I am, you might periodically pause and ask yourself a few questions:

- When I close my eyes and picture myself, what do I see? How am I dressed? What am I doing? Am I at home or at work?

- Do the inevitable failures at work diminish my sense of self-worth? Do I feel like a failure as a person?

- Do I catch myself thinking about work at all times of the day and night? Do I bring work home most evenings and weekends?

- Do I throw myself into my work to escape from problems in my personal and family life? Would I rather be at work than at home?

- What are one or two things I could do to achieve a healthy balance between my work and the rest of my life?

Deep down we know that our work can't save us. It can't make everything better. It can't compensate for failed relationships, lifelong insecurities, a painful childhood. Work can't save us — only God can.

Spirituality of the Ordinary

If work is a paradox, if we give it both too little and too much meaning, then the solution must be paradoxical as well. We need a view of work that sees it not as a curse or an idol, but as something in between, something that is part of our spiritual life but not the whole of our spiritual life.

The medieval church was right to affirm the sanctity of work; its problem was in assuming that only certain work had spiritual significance. As far back as the Reformation, Luther and Calvin broke free of this idea and taught that any work could be a vocation if it was an avenue of service to God and to neighbor. Our calling is to love God and our neighbor through our work.

Similarly, in the encyclical *Laborem Exercens*, Pope John Paul II speaks of work as a way for humans to share in the creative work of God and Christ's

ongoing work of redemption.

This means that we serve our God in our everyday work. We are doing God's work not just when sitting in church, but when counseling a client, preparing a marketing report, repairing a balky computer or driving a truck. We collaborate with God as we respond competently and diligently to our tasks. As theologian Elizabeth Dreyer in "Toward a Spirituality of Work" puts it, "Gradually we are learning that to be a good plumber, truck driver, nurse, or janitor is the way to be a good Christian."

The people I encounter at work are not distractions to my spiritual life, but companions on a spiritual journey.

Our challenge is to cultivate an awareness of the opportunities for service and creativity in our everyday work. If God is in the details, as the theologians say, then we need to become sensitive to the ways we encounter God in the details of our daily lives. What we need is a spirituality of the ordinary.

Let me give an example. Many times a student will walk into my office and begin talking about a class assignment, only to open up gradually and reveal a deeper problem at the root of the visit — a family breakup, a vocational crisis, nagging doubts about self-identity. Yet I'm embarrassed to admit how often I catch myself surreptitiously peeking at my watch and wondering how I am going to get my "real" work done — preparation for a class, writing an article — if I spend so much time with this student.

How often I've overlooked the opportunities for ministry in my

work! Right now, at this moment, with this student, I have the opportunity to bring my faith and my work together. My work is not an impediment to my spiritual life; it is a vehicle for living out, for making flesh, my spiritual values.

How often I've forgotten what is called for: a ministry of the kind word, the attentive ear, a smile or a laugh, just being present for a student or colleague. The people I encounter at work are not distractions to my spiritual life, but companions on a spiritual journey, from whom I receive sustenance and to whom I, in turn, am called to minister.

The opportunities for service differ from work to work, of course, but no work is devoid of possibilities. Let me suggest a few questions to think about:

- What is your greatest satisfaction at work? Are there times when you feel especially close to God?

- What is your greatest disappointment at work? Are there times when you feel distant or estranged from God?

- What is one thing you could do right now to cultivate a sense of God in your work? What is one thing you could do to make your work more prayerful?

- Where are the opportunities in your work to serve others? Are you taking advantage of these opportunities? What more could you do?

- Where are the opportunities in your work to pursue justice? Are you taking advantage of these opportunities? What more could you do?

To Cherish and to Struggle

Work is not a curse or an idol, but something more, something less. It is holy but it is not divine. It can bring great joy and deep disappointment. The great Catholic writer Flannery O'Connor wrote, "You have to cherish the world at the same time you struggle to endure it." What O'Connor said about life applies to work as well. We must learn to cherish our work at the same time that we struggle to endure it. **W**

Should We Have Tailor-Made Children?

"I want a child free from the diseases that have afflicted my family."

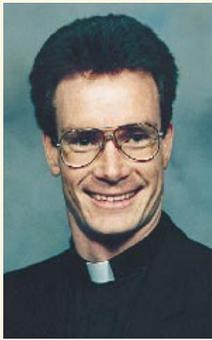
"I want a child who looks like me, even though I can't have children myself."

"I want a child who is a donor match for my son. He needs an organ transplant."

"I want a child with grandma's eyes."

"I want a child who can, in a way, replace my dying daughter."

by Kevin T. FitzGerald, S.J.
Research Associate, Cancer Research Center
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Editor's note: Fr. FitzGerald holds a Ph.D. in molecular genetics from Georgetown University in Washington, D.C. He is also a Ph.D. candidate in bioethics at Georgetown.

He was recently appointed to Creighton University's Board of Directors. Fr. FitzGerald's opinion has been sought frequently by the national news media since the cloning of Dolly the sheep in Scotland.

In April 1997, the journal *Nature Genetics* reported that Dr. Brigitte Boisselier, scientific director of Clonaid in the Bahamas, plans to offer human cloning for \$200,000. Dr. Boisselier defended this offer on the grounds that parents have the right to clone themselves. Such an offer immediately brings to mind two questions: Can people be cloned? Does a parent, or anyone else, have the right to clone themselves?

Considering the advancements in cloning sheep and cattle, which have been announced by a few biotechnology companies during the summer, the answer to the first question is that cloning people could be possible soon. Does this mean that people could make carbon copies of themselves? No. What it does mean is that cells could be removed from a human embryo, fetus or an adult, and that these cells could be used to create a new human embryo genetically identical to the individual who donated the cells. Upon being implanted successfully into a woman's uterus, this clone would grow up to be similar to a delayed identical twin of the person from whom the cells were taken.

Could watching a clone grow up be like watching a rerun of the cell donor's own childhood? No. Since natural identical twins (who can be quite distinct from one another) share the same womb during gestation, the

effects of the uterine environment on their development would be quite similar. Conversely, a clone would develop in a different womb, or the same womb at a different time. This difference alone could result in a clone being significantly less similar to the cell donor than if it had been a natural identical twin. In addition, the environment experienced by a clone during its childhood could be vastly different than the childhood of the cell donor. This, too, would result in more dissimilarities between a person and his or her clone.

With all these potential differences, why all this talk about cloning people? One reason for all the media coverage about cloning is the widely held misconception that cloning somehow involves producing exact copies of people almost instantaneously. Although this idea is, in fact, groundless, it has been used in movie scripts and science fiction novels.

Hence, when the announcement was made about the existence of Dolly, the first clone from an adult mammal, people naturally conjured up images of scientists secretly cloning the president and replacing him with a clone which they could control. Now that the impossibility of such a scenario is publicly acknowledged, attention can be directed to an assessment of the more serious proposals for the use of human cloning which have not been as widely discussed.

These proposals for the use of human cloning spread out along a spectrum from responding to psychological grief at the loss of a loved one to the possibility of medical interventions intended to prevent the passage

of disease from one generation to the next. A brief review of some of these suggestions provides an opportunity to evaluate their scientific and medical merit. This evaluation is the foundation for the answer to the second question posed at the beginning of this article concerning a parent's or anyone's right to try to clone themselves.

One proposal for using cloning to prevent the transmission of disease from parent to child involves genetic diseases which do not arise from mutations or abnormalities affecting the genes located in the nucleus of a cell. Human cells contain many small structures outside the nucleus, called mitochondria, which are crucial to cell function, and which contain their own genes. Egg cells have many mitochondria. Sperm also have them, but sperm



Dolly, the genetically cloned sheep, looks toward the camera at the Roslin Institute near Edinburgh, Scotland. Dolly was the first animal to be genetically cloned from adult cells.

mitochondria generally do not get into the egg when fertilization occurs. Therefore, only the mother has to be concerned about passing on a mitochondrial disease to her children.

Cloning technology then could be used to remove the nucleus from an embryo which has inherited diseased mitochondria. This nucleus would be placed into an enucleated egg cell which has healthy mitochondria. Hence, the genetic characteristics inherited from both parents' chromosomes would remain and the diseased

mitochondria would be eliminated. Since this procedure would be done in order to treat a disease which could be severely detrimental to the health of the offspring, it is proposed as con-

No human being
is replaceable -- not
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We are all unique.

forming with the accepted medical practice of taking some risks with the health of the patient, in this case the embryo, so that a significant health benefit can be achieved.

It is also an important part of medical practice to consider whether or not alternative methods might provide the same benefits with much less risk. An alternative to the above proposal is being researched now. This option involves transferring the nucleus of the mother's egg to the enucleated egg cell with the healthy mitochondria. If the transfer works, the new egg can be returned to the Fallopian tubes or uterus of the mother and, it is hoped, be fertilized. The significant difference here is that the cloning procedure requires research on and manipulation of embryos, while the nuclear transfer, when only eggs are used, does not. Looking ahead to an ethical evaluation of these two procedures, it would appear that the procedure of using eggs alone has the advantage since the loss of eggs in a failed procedure is less significant than the loss of embryos which can develop and grow and be born.

Another suggested use for human cloning is to supply needed tissues and organs for transplantation. In its most heartrending form, this proposal seeks to address the situation where a

child or infant requires a transplantation in order to live. The parents, it is proposed, could clone their child to produce a sibling who would provide a perfect transplant match. Presuming that the older child's disease does not have a genetic basis, the clone could donate an organ or tissue to save the life of the sick sibling.

Again, present research may provide better alternatives. Studies are ongoing into the possibility of transplanting special cells, called stem cells, which generate and regenerate the various tissues of the human body. These cells might be acquired from tissue and organ donors, both living and dead, or perhaps from the patient, whose own cells could be treated and reinfused. Cloning technology itself provides the possibility that animals genetically engineered to have tissues and organs compatible with humans could be cloned to provide their tissues and organs for transplantation into people. Both of these approaches would make the cloning of a new person medically unnecessary.

This potential medical advance is not the only reason, though, to refrain from using human cloning for transplantation purposes. Contemporary society holds that no adult should be forced to donate an organ or tissue against his or her will, not even to save the life of an innocent child. In an extension of this position, parents can speak for their own child in volunteering to donate tissue only if

it will not seriously threaten or impair the life of the child. Therefore, there are significant ethical and legal barriers already in place to prevent anyone from choosing in the name of someone who does not, as yet, exist and therefore cannot consent to the production of a body part for another.

But what if someone desires to have a person cloned just so that the clone could be loved? Such proposals are often raised in the context of a couple wanting to replace a dying child with a clone of that child, or a spouse having a clone of the dying spouse. In these cases it is crucial to bear in mind that there will be significant differences between clones and the people from whom they are cloned.

No human being is replaceable — not even physiologically. We are all unique. The desire to clone a loved

child or spouse to replace the lost loved one may well indicate a retreat to a biological solution from the age-old problem of dealing with the grief and trauma of death. Even if the psychological struggle with the loss of a loved one eventually is dealt with successfully, the cloned child would always have to live with the reality of having been cloned to replace another.

There could be other difficult

social and psychological realities with which a clone might have to live. Perhaps the experiences of children conceived by means of artificial reproductive technologies can be used to



Two rhesus monkeys were cloned from embryos last year at the Oregon Regional Primate Research Center in Beaverton, Ore.

extrapolate what clones might experience growing up — but perhaps not. Whichever is the case, these issues require attention because some physicians in the field of reproductive technology will want to offer cloning as an option to their patients, as Clonaid already intends to do.

This last proposal for the use of human cloning — to help solve reproductive problems — raises again the question of who has the right to try to be cloned. Discussions about people's rights can be complex, even convoluted. One important distinction to make is between negative (liberty) rights and positive (welfare) rights. Regarding cloning, liberty rights would encompass the moral and legal freedom to reproduce by cloning, or assist others in doing so, without violating any countervailing laws or moral obligations. Welfare rights would entitle those who wish to be cloned to assistance from other parties, such as health insurance providers or the government. Since liberty rights are required in order to have welfare rights, the question of people's rights should begin with the former.

Legal liberty rights to reproduce are virtually unlimited in the United States. Though some state and federal legislation has been proposed which would prevent all reproductive technology clinics from offering human cloning as a treatment option, the present situation is that many private clinics are not prevented legally from offering cloning as a treatment for infertility. That leaves the moral part of the question: Should such services be allowed to offer cloning, and, conversely, should patients be allowed to request it?

Considering the fact that reproductive technology clinics already employ a panel of techniques to combat fertility problems, the medical need to use cloning to solve a particular reproductive problem may be quite limited, if the need exists at all. This circumstance was apparent in the proposed uses for cloning already reviewed.

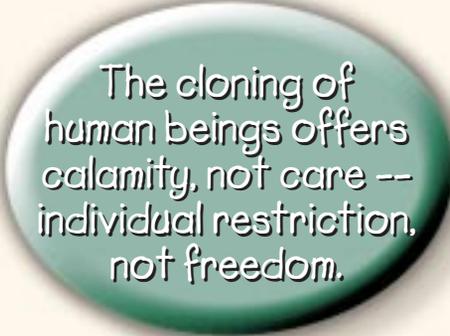
Hence, in the ethical evaluation of whether or not cloning should be offered, the burden of proof is on those who want to use cloning to treat patients. They must demonstrate clearly what benefits it would provide and how the potential risks would be minimized.

Some potential risks have already been elucidated. Cloning technology would require the treatment and manipulation of embryos. Many embryos would be lost in the process of perfecting the cloning techniques on humans, and even in the regular employment of the procedure on patients. If these embryos were fatally diseased, one could argue that the cloning procedure is their only hope. But if the cloning procedure creates them in the first place, what ethical argument can justify creating embryos which are most likely going to die or be destroyed?

The reasons advanced in favor of cloning, reviewed above, focus on the desire of parents or individuals to create a child of this or that type. The type of child desired would have certain genetic characteristics, including the characteristic that the child has a particular person's genes. This desire to have a child of a particular genetic type conflicts with the value of the uniqueness of each individual. Consequently, such desires could result in harm to the person cloned because that person would be expected to resemble physically and behaviorally the particular genetic type to an even greater degree than what is expected of other children. What freedom to be him or herself would a clone receive from parents that chose to create a clone in order to get a particular type of individual?

On a societal level, the desire to produce children of predicted types also could cause great harm. If children do not behave as expected, or fit in as expected, it could be surmised that they were not produced properly. The struggles of growing, developing and living could be reduced to mere technical problems to be solved

through technology. If this sounds too futuristic and farfetched, consider the present clamor in medicine for drugs and treatments to take care of all problems people encounter in life — especially suffering, dying, and even death itself.



The cloning of human beings offers calamity, not care -- individual restriction, not freedom.

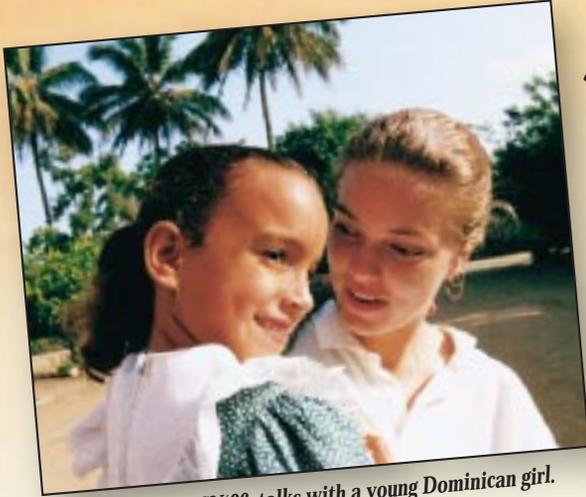
Scientific advancements and medical technology have contributed greatly to the quality of life people can have. Our God-given abilities allow us to achieve and accomplish so much for which we should be thankful. The temptation humankind faces continually is to look to our own achievements for salvation from whatever ails us. Advancements in mammalian cloning could be one of those accomplishments which provides great benefit to many who are in need. It also could be used to provide a way for us to run from who we are by attempting to make ourselves into that which we are not ... mere products of our genes and biochemical reactions.

It is our moral obligation as Christians to seek to use our abilities and accomplishments to care for one another and creation as best we can, and not to run from our limitations. At present, the cloning of human beings offers calamity, not care — individual restriction, not freedom.

Our moral obligation, then, is to exercise our right not to employ this new technology to produce tailor-made children for whatever reason, but to continue to be open to the benefits cloning may provide through medical research. **W**

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Amy Smith, BSN '96, talks with a young Dominican girl.
Photos by Don Doll, S.J.

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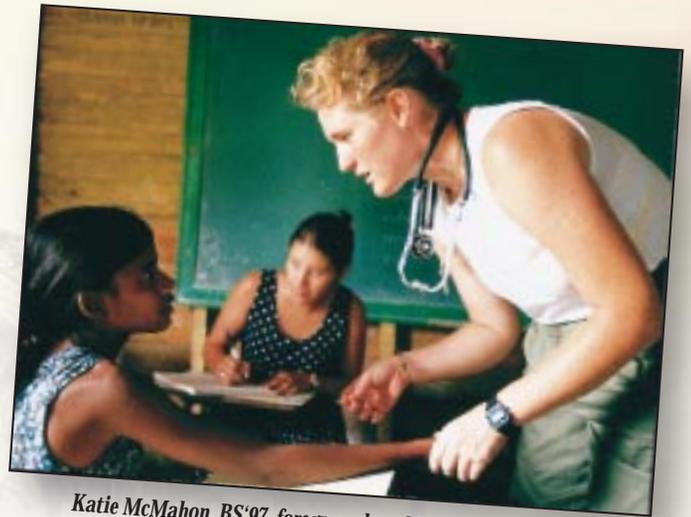
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For more information about ILAC, contact the following: Fr. Ernesto Travieso, S.J., executive director, or Virginia McGill, director, at 1-800-343-3645.



Katie McMahon, BS '97, foreground, and Tanya Reindl, BS '97, background, take a child's medical history at the clinic in Henequen.

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